

Appl. No. Serial No. 10/805,822

Amdt. Dated January 31, 2006

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AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1 - 13. (Cancelled)

14. (Currently Amended) A method of fabricating a ~~semiconductor integrated circuit~~ lateral transistor comprising:

selectively forming a first diffusion region of ~~the~~ a second conductivity type on a semiconductor substrate of a first conductivity type;

growing an epitaxial layer of the second conductivity type on said first diffusion region so as to make said first diffusion region a first buried region;

selectively diffusing impurity atoms of the second conductivity type so as to form a first plug region of the second conductivity type, from a top surface of said epitaxial layer such that a bottom of said first plug region reaches to said first buried region;

selectively diffusing impurity atoms of the second conductivity type so as to form a graded base region of the second conductivity type, from the top surface of said epitaxial layer, wherein a lateral position of the graded base region is separated from ~~the~~ a lateral position of said first plug region and a vertical position of the graded base region is separated from ~~the~~ a vertical position of said first buried region, the graded base region has a doping profile such that an impurity concentration decreases towards a peripheral region from a central region of the graded base region;

forming a first main electrode region of the first conductivity type in and at ~~the~~ a top surface of said graded base region; and

forming a ~~said~~ second main electrode region of the first conductivity type, ~~so as to sandwich said graded base region between said first and second main electrode regions, in~~

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and at the top surface of said epitaxial layer at a location separated from said first main electrode region, wherein ~~so as to sandwich said graded base region between~~ said first and second main electrode regions laterally sandwich said graded base region, the impurity concentration of said graded base region decreases gradually along a lateral direction from said first main electrode region towards said second main electrode region when the lateral transistor is unbiased, and a remaining portion of said epitaxial layer laterally sandwiched between said graded base region and said second main electrode region serves as a uniform base region having a uniform lateral doping profile, the lateral doping profile being measured along a lateral direction parallel to the top surface of said epitaxial layer,

wherein a combination of said buried base region, said uniform base region and said graded base region serves as a base region.

15. (Currently Amended) The method of claim 14, further comprising selectively forming a second diffusion region of the second conductivity type on said semiconductor substrate before said growing the epitaxial layer, a lateral position of the second diffusion region is separated from the a lateral position of said first diffusion region, wherein said growing the epitaxial layer makes said second diffusion region a second buried region, and the second buried region serving serves as a part of a third main electrode region.

16. (Original) The method of claim 15, further comprising forming a second base region of the first conductivity type above said second buried region in the epitaxial layer.

17. (Original) The method of claim 16, further comprising forming a fourth main electrode region of the second conductivity type in and at a top surface of the second base region.

18. (Currently Amended) The method of claim 14, further comprising forming a silicon oxide film on the top surface of said epitaxial layer, wherein impurity atoms for

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forming said graded base region and said first main electrode region are doped through ~~the same~~ a common diffusion window formed in said silicon oxide film.

19. (Currently Amended) The method of claim 14, wherein said selectively diffusing impurity atoms so as to form the graded base region and said forming the first main electrode region in and at the top surface of the graded base region comprises;

~~said forming the~~ a silicon oxide film on the top surface of the epitaxial layer;

forming ~~the~~ a diffusion window in the silicon oxide film;

implanting impurity ions of the impurity atoms of the second conductivity type through the diffusion window;

annealing the semiconductor substrate so as to form the graded base region up to an intermediate diffusion depth of the graded base region;

implanting impurity ions of the first conductivity type through the diffusion window;
and

annealing the semiconductor substrate so as to form the first main electrode region and to drive-in the graded base region deeper than the intermediate diffusion depth.